

# International Investors in Local Bond Markets: Indiscriminate Flows or Discriminating Tastes?

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*"The extent to which distortions in one country may spread to financial market developments in the other EMEs will depend to a great degree also on whether international investors look at the EMEs as a homogeneous asset class or whether they take an increasingly differentiated view in their evaluations of individual EMEs and their respective progress towards achieving macroeconomic stability."*

Bundesbank, Financial Stability Review 2007

- Investor behavior in bond markets is of great interest to policymakers in both emerging market economies (EMEs) and advanced economies (AEs).
- During the global financial crisis (GFC), pattern of capital flows were highly heterogeneous across types of flows and destinations (Milesi–Ferretti and Tille 2012).
- We focus on investor behavior in local currency bond markets (LCBMs).

## Outline of Presentation

- Introduction & Motivation
  - LCBMs
  - Main questions & Results
  - Most recent literature
  - Contribution
- Data
- Methodology & Results
  - Expected returns
  - Bond Holdings
- Conclusion

## LCBMs in '80s and '90s

- In the 1980s and 1990s, LCBMs were non-existent; not considered a serious asset class.
- EMEs borrowed heavily in foreign currencies.
  - Assets in local currency and liabilities in foreign currency led to currency mismatches.
  - Foreign currency borrowing associated with financial instability and ensuing crises.
- EME crises led to a renewed focus on development of LCBMs.

## Why LCBMs?

- Potential contributions of LCBMs:
  - EMEs less dependent on bank finance
  - Ameliorate currency and maturity mismatches, enhancing financial stability.
  - International risk sharing / Diversification benefits for investors
- Potential Concerns:
  - EME LCBMs could be subject to volatile flows
  - Surges, excessive appreciation, lending booms/bubbles, etc.
  - Credit booms lead to crises
  - External shocks could generate disorderly exit

## Key Questions

- 1 How have LCBMs evolved in the past decade? What are the returns characteristics of these markets?
  - 2 How did cross-border bond investors behave during the GFC?
  - 3 How did EME LCBMs fare during GFC?
  - 4 Do investors discriminate among EMEs based on country-specific fundamentals or are flows driven by external factors?
- We examine portfolio reallocations of US investors during 2006-2011.
  - Employ country-level holdings data built from high-quality security-level information collected by US Treasury.
  - Panel dataset of cross-border portfolio positions before, during, and after the GFC.

## Main results

- LCBMs grew substantially over the past decade. Share of foreign currency borrowing greatly diminished in EMEs.
- US investors decreased total foreign bond holdings during GFC, but maintained EME allocation.
- Push factors (US 10-yr yield and VIX) important.
- US investors discriminate among EMEs based on macro fundamentals (CA balance and inflation volatility).



## Recent Literature on Investor Behavior

- Milesi-Ferretti and Tille (2012)
  - Great retrenchment during GFC but pattern was highly heterogeneous across types of flows and destinations.
- Raddatz and Schmukler (2012)
  - International investors act pro-cyclically and expose countries to foreign shocks; large reallocations during GFC.
- Fratzscher (2012)
  - Common shocks exert a large effect on flows during GFC and recovery, but country-specific institutional factors and macroeconomic fundamentals also play a role.

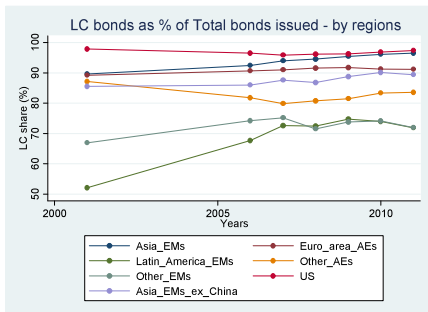
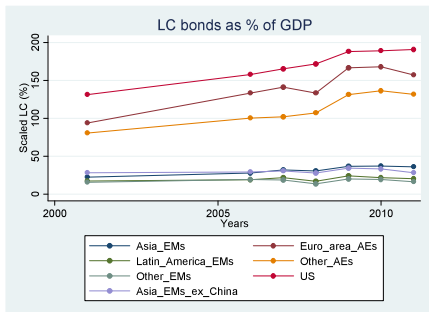
## Our Contribution

- None of the existing studies focus exclusively on bond markets, nor do they distinguish among bonds denominated in different currencies.
- We use US Treasury data on US investors cross-border bond holdings.
- Study US investor behavior in LCBMs, particularly interesting because:
  - EME LCBMs new asset class facing first big test
  - Financial stability implications

└ Evolution of LCBMs

└ AEs vs EMEs-Issuances and US Holdings

- LCBMs are largest (as % GDP) in AEs.
- Many EMEs have lessened their reliance on foreign currency (FC) bonds.
- Asian EMEs also increasing their already high share of local currency (LC) bonds.

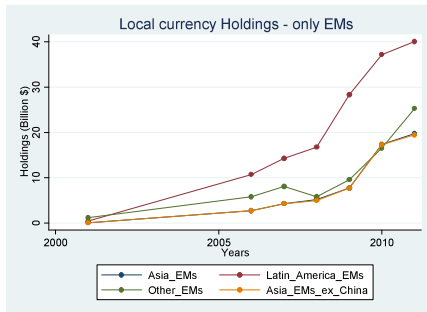
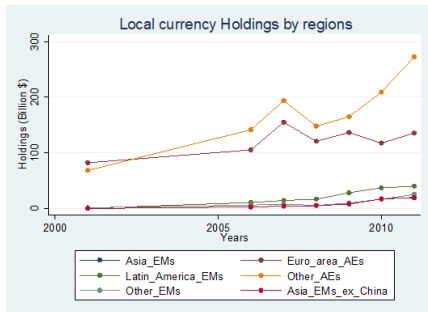


## International Investors in Local Bond Markets: Indiscriminate Flows or Discriminating Tastes?

### └ Evolution of LCBMs

#### └ AEs vs EMEs-Issuances and US Holdings

- Most US holdings of LC bonds are in AEs.
- US holdings of EME LC bonds have increased substantially.



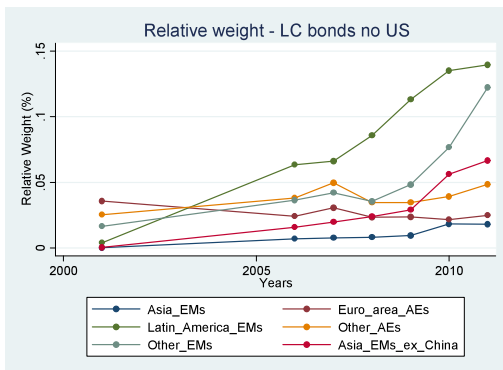
- We use relative portfolio weight, motivated by International CAPM model (Cooper and Kaplanis 1986)

## Relative Weight

$$\frac{\omega_{i,US}}{\omega_{i,m}} = \frac{{}_{lc}H_i^{US} / \sum_i H_i^{US}}{{}_{lc}MCap_i / \sum_i MCap_i}$$

- LHS: relative portfolio weight assigned to country  $i$ 's local currency bond market by US investors.

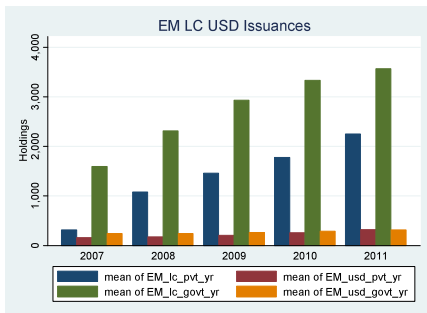
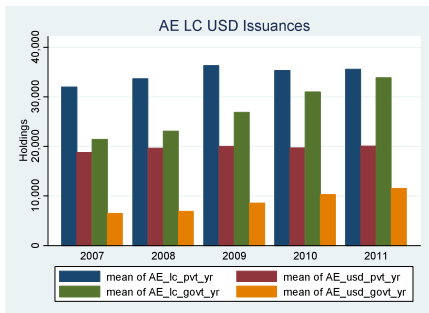
- With both amount invested and market size increasing, one question is whether US investors have become less underweight in these markets.
- US investors have become less underweight in many EME LCBMs.
- They are less underweight in EMEs than in AEs.
- The variation we attempt to understand is within-country changes in US relative weights.



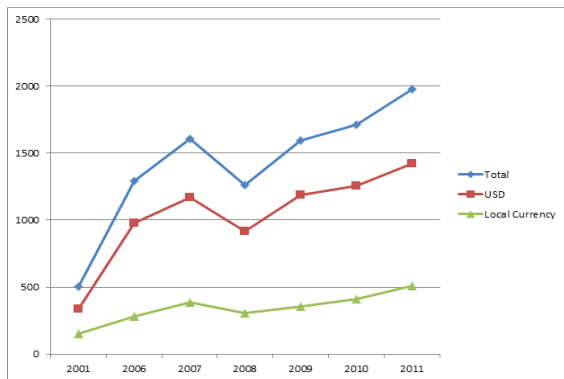
└ Evolution of LCBMs

└ Sectoral Splits-Issuances by AEs and EMEs

- AE bonds are mostly LC. For USD-denominated bonds, most are private.
- In EMEs, most bonds are sovereign LC, although LC private has increased sharply since 2007.

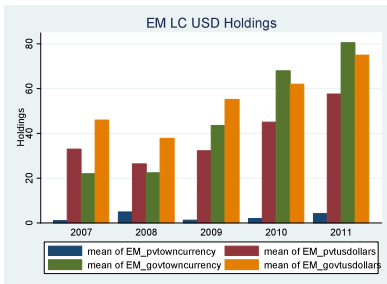
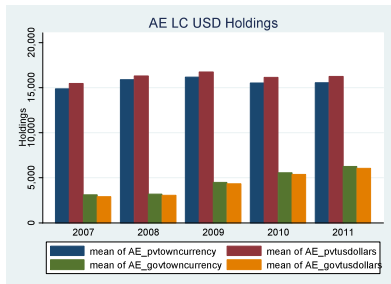


- We know that most US holdings are dollar denominated.
- But interested in what lies beneath the aggregates.





- US holdings of AE bonds
  - US holdings in AEs are nearly all private, almost equally LC and USD.
  - US holdings of AE government bonds, whether LC or USD, are much smaller.
- US holdings of EME bonds
  - EME holdings are mostly sovereign, whether LC or USD.
  - Holdings of private USD bonds are now almost as large.
  - Holdings of LC private bonds are near zero.



- High growth, exceptionally in some countries (Ireland, Italy, Spain, Iceland before its crash).

	<u>% of GDP</u>			<u>% of Total</u>		
	<u>2001</u>	<u>2006</u>	<u>2011</u>	<u>2001</u>	<u>2006</u>	<u>2011</u>
<b>AE</b>	<b>105</b>	<b>131</b>	<b>159</b>	<b>93</b>	<b>91</b>	<b>91</b>
<u>Euro area</u>	94	133	157	89	91	91
Germany	96	119	105	92	91	89
Greece	74	107	190	89	97	99
Ireland	46	285	470	65	78	81
Italy	114	147	180	96	97	98
Spain	53	135	181	92	97	97
<u>Other AEs</u>	81	100	132	87	82	84
Australia	30	41	56	55	51	64
Canada	69	65	88	72	77	78
Denmark	160	194	211	90	86	84
Iceland	78	358	132	63	58	45
Japan	108	158	209	99	99	99
United Kingdom	46	65	115	62	52	58

- Growth strong since 2006

	<u>% of GDP</u>			<u>% of Total</u>		
	<u>2001</u>	<u>2006</u>	<u>2011</u>	<u>2001</u>	<u>2006</u>	<u>2011</u>
<b>Emerging Markets</b>	<b>18</b>	<b>19</b>	<b>24</b>	<b>67</b>	<b>77</b>	<b>84</b>
<u>Euro area EMs</u>	17	18	16	64	71	69
Hungary	28	46	28	60	66	52
Poland	20	34	31	86	77	72
<u>Latin America EMs</u>	<b>17</b>	<b>19</b>	<b>20</b>	<b>52</b>	<b>68</b>	<b>72</b>
Argentina	14	30	8	29	50	40
Brazil	20	15	18	59	69	78
Chile	42	24	32	77	72	75
Colombia	19	28	26	61	76	80
Mexico	17	24	32	59	78	78
Peru	12	12	14	60	54	59
<u>Asia EMs</u>	<b>22</b>	<b>28</b>	<b>36</b>	<b>90</b>	<b>92</b>	<b>96</b>

└ Data

└ Data on US Holdings

- Large increase in absolute holdings and relative portfolio weights.

	2011		2008		2006		2001	
	US Holdings (\$ B)	$\varphi_{us}/\varphi_m$	US Holdings (\$ B)	$\varphi_{us}/\varphi_m$	US Holdings (\$ B)	$\varphi_{us}/\varphi_m$	US Holdings (\$ B)	$\varphi_{us}/\varphi_m$
<b>EMEs</b>	<b>86.89</b>	<b>0.05</b>	<b>28.39</b>	<b>0.03</b>	<b>20.11</b>	<b>0.03</b>	<b>1.72</b>	<b>0.00</b>
<u>Euro area</u>	<b>17.61</b>	<b>0.11</b>	<b>4.65</b>	<b>0.03</b>	<b>4.74</b>	<b>0.04</b>	<b>0.74</b>	<b>0.01</b>
Hungary	3.26	0.31	1.52	0.09	0.62	0.04	0.17	0.03
Poland	13.24	0.30	2.89	0.08	3.83	0.11	0.55	0.04
Russia	0.66	0.03	0.10	0.01	0.02	0.00	0.00	0.00
<u>Latin America</u>	<b>40.05</b>	<b>0.14</b>	<b>16.74</b>	<b>0.09</b>	<b>10.73</b>	<b>0.06</b>	<b>0.46</b>	<b>0.00</b>
Argentina	0.36	0.03	0.34	0.02	2.39	0.12	0.07	0.01
Brazil	20.11	0.16	8.48	0.11	4.72	0.09	0.08	0.00
Chile	0.97	0.04	0.01	0.00	0.00	0.00	0.01	0.00
Colombia	4.01	0.17	3.37	0.21	1.43	0.10	0.00	0.00
Mexico	13.31	0.13	3.99	0.06	2.08	0.03	0.28	0.01
Peru	1.30	0.20	0.33	0.07	0.06	0.02	0.00	0.00
<u>Asia</u>	<b>19.76</b>	<b>0.02</b>	<b>5.17</b>	<b>0.01</b>	<b>2.77</b>	<b>0.01</b>	<b>0.06</b>	<b>0.00</b>
Indonesia	5.83	0.25	1.85	0.12	1.08	0.06	0.00	0.00
Malaysia	7.73	0.12	2.59	0.06	1.06	0.04	0.02	0.00
Philippines	3.97	0.23	0.05	0.00	0.04	0.00	0.01	0.00
Thailand	1.58	0.03	0.48	0.02	0.57	0.02	0.03	0.00
<u>Other EMs</u>								
South Africa	7.34	0.16	0.91	0.04	1.04	0.03	0.44	0.03

- Modest increase in absolute holdings & portfolio weight < EME

	2011		2008		2006		2001	
	US Holdings (\$ B)	$\varphi_{us}/\varphi_m$	US Holdings (\$ B)	$\varphi_{us}/\varphi_m$	US Holdings (\$ B)	$\varphi_{us}/\varphi_m$	US Holdings (\$ B)	$\varphi_{us}/\varphi_m$
<b>AEs</b>	<b>408.69</b>	<b>0.04</b>	<b>268.92</b>	<b>0.03</b>	<b>247.12</b>	<b>0.03</b>	<b>150.33</b>	<b>0.03</b>
<u>Euro area</u>	<b>135.80</b>	<b>0.02</b>	<b>120.64</b>	<b>0.02</b>	<b>105.49</b>	<b>0.02</b>	<b>82.02</b>	<b>0.04</b>
France	27.32	0.02	27.86	0.03	29.93	0.04	14.70	0.03
Germany	52.30	0.05	55.12	0.05	38.63	0.04	38.15	0.05
Greece	0.78	0.01	0.81	0.01	1.14	0.01	1.38	0.04
Ireland	10.91	0.04	5.25	0.02	5.90	0.03	0.49	0.03
Italy	16.52	0.02	8.86	0.01	6.18	0.01	9.55	0.02
Spain	6.50	0.01	3.80	0.01	3.63	0.01	5.68	0.05
<u>Other AEs</u>	<b>272.86</b>	<b>0.05</b>	<b>148.25</b>	<b>0.03</b>	<b>141.63</b>	<b>0.04</b>	<b>68.31</b>	<b>0.03</b>
Australia	26.87	0.13	7.75	0.08	6.20	0.07	3.26	0.07
Canada	102.85	0.25	44.24	0.17	39.99	0.15	21.48	0.11
Denmark	1.50	0.01	7.98	0.04	8.36	0.05	2.27	0.02
Hong Kong	1.35	0.11	0.26	0.02	0.25	0.02	0.07	0.01
Iceland	0.54	0.11	1.28	0.28	0.34	0.02	0.00	0.00
Japan	50.19	0.02	49.67	0.02	39.41	0.02	21.35	0.01
Norway	7.04	0.12	1.48	0.04	2.06	0.06	0.41	0.02
Singapore	5.54	0.23	1.59	0.07	2.48	0.14	0.04	0.00
South Korea	12.95	0.04	3.43	0.02	2.32	0.01	0.25	0.00
UK	48.40	0.06	23.50	0.04	30.39	0.06	13.51	0.05

- EME bonds provided attractive returns and significant diversification benefits to US investors.

	Mean Monthly Return (%)	Variance	Skewness	Corr w/US
<b>AE Local Currency Bonds</b>				
Unhedged	0.526	7.562	-0.370	0.431
Hedged	0.357	0.741	0.197	0.768
<b>EME Local Currency Bonds</b>				
Unhedged	0.600	10.60	-0.973	-0.002
Hedged	0.373	1.180	1.249	0.247
<b>EMBI (USD-denominated)</b>				
	0.670	8.767	-3.510	0.151

- We posit that global LCBM investors have a 1-yr horizon and so predict one year expected mean, var, and skew of each country's returns
- Methodology: Dynamic Panel (Arellano and Bond 1991)

$$y_{it} = \sum_{j=1}^p \alpha_j y_{i,t-j} + x_{it} \beta_1 + v_i + \varepsilon_{it}$$

$$\frac{\omega_{i,US}}{\omega_{i,m}} = f(x, V_x, S_x, Barriers, Corr, push, pull)$$

- $x_i, V_i, S_i$  are the expected mean, variance, and skewness of returns.
- *Barriers* is a measure of impediments to cross-border investment in country  $i$ 's LCBM
- *Corr* is the correlation of bond returns of country  $i$  with U.S. bond returns.



	Mean	Standard Deviation	Skewness
<b>DepVar</b>			
Lag 1	<b>-0.1518**</b> (0.0750)	<b>0.1783***</b> (0.0704)	<b>-0.1181**</b> (0.0550)
Lag 2	<b>-0.2389***</b> (0.0435)		0.0890 (0.0628)
<b>Yield</b>	-0.0001 (0.0015)	<b>0.0029**</b> (0.0013)	0.0236 (0.0359)
Lag 1	<b>0.0028***</b> (0.0010)	-0.0016 (0.0010)	-0.0509 (0.0434)
<b>Inflation</b>			<b>-0.0712***</b> (0.0268)
<b>Per capita GDP Growth Rate</b>	<b>0.0006**</b> (0.0003)	-0.0005 (0.0005)	<b>0.0420***</b> (0.0104)
Lag 1	<b>0.0009***</b> (0.0004)		<b>0.0238**</b> (0.0114)
Lag 2			<b>0.0566***</b> (0.0128)
<b>Observations</b>	321	347	320
<b>Correlation: predicted and actual values</b>	<b>0.2586***</b>	<b>0.5956***</b>	<b>0.3049***</b>

- Higher past returns signal lower future returns, while past GDP growth predicts future returns.
- Volatility exhibits persistence.
- Higher inflation predicts negatively skewed returns.

$$\frac{\omega_{i,US}}{\omega_{i,m}} = f(x^+, \bar{V}_x^-, \bar{S}_x^+, \bar{Barriers}^-, \bar{Corr}^-, \bar{push}, \bar{pull})$$

- Destination country fixed effects
- Standard errors clustered at country level
- Barriers = FA restrictions and Institutional factors
- Push factors = US 10-yr Treasury yield & VIX
- Pull factors = CA/GDP, Inflation volatility

- US investor reallocations driven by global monetary and risk conditions along with macroeconomic fundamentals (especially in EMEs)

	Full Sample		AEs	EMEs
	(1)	(2)	(3)	(4)
Reg_CR	0.002 (0.001)	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)
FA_Open	-0.001 (0.001)	-0.000 (0.001)		-0.001 (0.001)
E(mean)	0.484 (0.684)	-0.408 (0.621)	<b>1.212</b> <b>(0.626)*</b>	-0.013 (0.880)
E(stdev)	-0.181 (0.364)	0.214 (0.306)	-0.269 (0.578)	0.048 (0.505)
E(skew)	0.023 (0.017)	0.012 (0.013)	0.018 (0.016)	-0.001 (0.013)
Corr w/US	0.010 (0.020)	0.020 (0.019)	0.009 (0.022)	0.030 (0.029)
<b>USi10</b>	<b>-0.027</b> <b>(0.006)***</b>	<b>-0.027</b> <b>(0.005)***</b>	<b>-0.013</b> <b>(0.006)*</b>	<b>-0.041</b> <b>(0.007)***</b>
<b>VIX</b>	<b>-0.002</b> <b>(0.001)***</b>	<b>-0.002</b> <b>(0.000)***</b>	<b>-0.001</b> <b>(0.001)**</b>	<b>-0.003</b> <b>(0.001)***</b>
<b>CA/GDP</b>		0.002 (0.002)	-0.000 (0.002)	<b>0.004</b> <b>(0.002)**</b>
<b>Inf_vol</b>		-0.017 (0.007)**	-0.001 (0.005)	<b>-0.016</b> <b>(0.008)*</b>
Observations	222	218	121	97
Countries	38	38	21	17

Table: Dependent Variable: Relative portfolio weights of US investors

	LCTotal All	LCTotal AE	LCTotal EME	LCGovt All	LCGovt AE	LCGovt EME	LCPvt All	LCPvt AE	LCPvt EME
Reg_Cr	0.153 (0.112)	-0.010 (0.110)	0.147 (0.107)	0.296 (0.282)	-0.148 (0.809)	0.240 (0.229)	0.229 (0.741)	0.293 (0.250)	-0.656 (1.183)
FA_Open	-0.037 (0.065)		-0.060 (0.043)	-0.174 (0.117)		-0.108 (0.138)	-0.177 (1.307)		-0.490 (1.227)
CA/GDP	0.075 (0.142)	0.013 (0.238)	0.315* (0.154)	0.024 (0.664)	-0.505 (1.231)	<b>0.911**</b> <b>(0.361)</b>	-0.763 (0.768)	0.231 (0.236)	0.085 (1.165)
Inf_vol	-2.295*** (0.748)	-0.197 (0.677)	-2.254** (0.819)	-2.992 (2.356)	2.736 (3.203)	-3.504 (2.091)	0.789 (3.448)	-0.034 (0.587)	8.202 (11.361)
Yield	0.172 (0.154)	-0.164 (0.223)	0.539** (0.248)	0.994* (0.523)	0.623 (1.382)	<b>1.179**</b> <b>(0.450)</b>	4.095 (3.720)	-0.213 (0.277)	7.680 (7.005)
Grrate	0.122 (0.081)	0.134 (0.118)	0.283** (0.121)	0.217 (0.260)	0.218 (0.474)	<b>0.545**</b> <b>(0.242)</b>	0.619 (0.706)	0.030 (0.260)	0.498 (1.065)
2007	0.286 (0.446)	0.298 (0.439)	0.842 (0.960)						
2008	1.572** (0.737)	-0.160 (0.437)	<b>3.417**</b> <b>(1.188)</b>	-1.079 (2.072)	-7.161*** (2.497)	5.611*** (1.807)	12.125 (11.265)	3.805 (2.711)	16.757 (23.058)
2009	3.522*** (0.939)	0.396 (0.804)	<b>5.846***</b> <b>(1.037)</b>	2.575 (3.304)	-7.510** (3.439)	9.894*** (2.331)	8.358 (9.223)	2.597 (1.584)	2.533 (8.298)
2010	4.303*** (1.119)	-0.048 (0.716)	<b>7.599***</b> <b>(1.349)</b>	4.495 (3.167)	-6.806** (3.083)	12.786*** (3.124)	6.567 (5.987)	2.105 (2.113)	9.054 (10.438)
2011	5.867*** (1.244)	1.738 (1.232)	<b>9.794***</b> <b>(1.767)</b>	8.290** (3.275)	-2.381 (3.758)	17.468*** (3.337)	13.655 (9.432)	2.955 (2.060)	31.195 (25.099)
R <sup>2</sup>	0.38	0.17	0.59	0.19	0.15	0.52	0.05	0.08	0.09
N	220	121	99	178	100	78	178	100	78

## Summary

- LCBMs grew substantially over the past decade.
- Share of foreign currency bonds diminished in EMEs.
- Global push factors important
  - Lower US yields powerful influence on US holdings of EME LC bonds
  - Allocations to EME bonds also sensitive to VIX.
- US investors discriminate among EMEs based on macro fundamentals (CA balance and inflation volatility).

Thank You For Your Attention!